

Psoriasis Is Common, Carries a Substantial Burden Even When Not Extensive, and Is Associated with Widespread Treatment Dissatisfaction

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The impact of psoriasis on quality of life has been studied in select patient populations. Population-based data detailing the distribution of extent of disease, associated problems in everyday life, and treatment satisfaction for the US population have been lacking. Our population-based survey indicates that approximately 4.5 million adults have been diagnosed as having psoriasis. Most (59%) have little or no involvement, but 650,000 adults have at least three palms of body surface involved and more than 1,000,000 indicate substantial dissatisfaction with their treatment. Only 5% of patients (56,000) who report severe dissatisfaction with current therapy have extensive disease (10 palms). Many individuals with little psoriasis at the time of interview considered the disease to be a large problem in everyday life.

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Psoriasis is a chronic skin disease most often manifested as red scaling plaques. Although estimates of psoriasis prevalence vary, it is common in many populations. The body surface area affected and the degree to which psoriasis is a problem varies considerably among patients and over time. Select groups of patients commonly report dissatisfaction with available therapy (Krueger *et al*, 2001). Population-based estimates of the prevalence of psoriasis, the distribution of area involved, problems in everyday life, and treatment satisfaction among those affected in the United States are lacking.

After years of receiving scant attention, psoriasis has become a prominent focus of new drug development, particularly of biologic therapies that target the immune system (Griffiths, 2002). With the development of new therapeutic options for psoriasis, better information on disease prevalence and problem in everyday life is particularly useful.

Results

Prevalence and demographic characteristics Of the 27,220 completed interviews, 601 (2.2%) respondents reported having been diagnosed by a physician with psoriasis (Table I). We estimate that there are 4.55 million persons (95% CI, 4.15–4.95) age 18 or older in the contiguous United States in 2001 who had been diagnosed as having psoriasis. Patients reporting psoriasis were more likely to be women (OR, 1.37; 95% CI, 1.14–1.64). Prevalence increases significantly with age to age 35 (1.4%,

age 18–25; 2.1% age 25–35; $p < 0.01$) but did not vary significantly after age 35 (range, 2.4%–2.5%) (Table I). Compared to white respondents, black respondents were significantly less likely to report having been diagnosed by a physician with psoriasis (OR, 0.54; 95% CI, 0.34–0.85). The distribution of income and education did not differ significantly between persons reporting psoriasis and others (data not shown).

Extent, problem, and treatment satisfaction Table II provides the distribution of reported problem caused by the disease in everyday life, extent, and treatment satisfaction among persons reporting psoriasis. Approximately one-half million persons find their psoriasis a large problem and 1 million are dissatisfied with its therapy. Forty percent of the estimated half million persons who indicate psoriasis is a substantial problem had at least three palms of psoriasis at the time of their interview (Fig 1). Patients who classified their psoriasis as a large problem were three times more likely to be dissatisfied with treatment than other patients (OR, 3.34; 95% CI, 1.86–6.00). Among those reporting limited current skin involvement (one or two palms covered), approximately 800,000 persons indicate substantial dissatisfaction with therapy (Fig 1).

More than 300,000 patients with at least 3 or more palms of coverage were dissatisfied with therapy and/or found the disease to be a large problem. Persons with at least 10 palms of coverage were much more likely to report that psoriasis was a large problem (OR, 14.50; 95% CI, 5.00–42.04) and more likely to indicate dissatisfaction with therapy (OR, 3.14; 95% CI, 1.20–8.23) than those with little psoriasis at the time of interview.

Abbreviation: CI, confidence interval(s)

Table I. Distribution of demographic characteristics of all survey respondents and those diagnosed with psoriasis and estimated number of persons and psoriasis prevalence in continental United States by those demographic characteristics

Variables	No. of survey respondents (%)	Estimates of persons in US population ^a in millions (95% CI)	No. of persons with psoriasis ^b (%)	Estimates (in thousands) of persons with psoriasis in US population ^a (95% CI)	Prevalence (%) of psoriasis in continental United States (95% CI)
Total	27,220	203.9	601	4550 (4150–4951)	2.2 (2.0–2.4)
Sex					
Male	13,146 (48)	98.6 (97.2–100.0)	244 (41)	1844 (1593–2095)	1.9 (1.6–2.1)
Female	14,074 (52)	106.4 (105.0–108.0)	357 (59)	2705 (2393–3016)	2.5 (2.3–2.8)
Age (years)					
18–24	2772 (10)	24.4 (23.4–25.4)	32 (5)	332 (192–472)	1.4 (0.8–1.9)
25–34	4647 (17)	38.2 (37.0–39.3)	92 (15)	781 (602–960)	2.1 (1.5–2.5)
35–44	5554 (20)	45.3 (44.2–46.5)	128 (21)	1093 (889–1298)	2.4 (2.0–2.9)
45–54	5482 (20)	36.6 (35.6–37.5)	132 (22)	888 (721–1054)	2.4 (2.0–2.9)
55–64	3552 (13)	23.9 (23.1–24.7)	95 (16)	623 (494–571)	2.6 (2.1–3.1)
> 65	4669 (17)	32.6 (31.7–33.5)	120 (20)	816 (665–966)	2.5 (2.1–3.0)
Ethnicity					
White	21,921 (81)	165.8 (164.0–167.0)	541 (90)	4090 (3717–4464)	2.5 (2.2–2.7)
Black	2443 (9)	21.2 (20.3–22.1)	27 (5)	271 (151–392)	1.3 (0.7–1.8)
Other	2856 (10)	18.0 (17.2–18.7)	33 (5)	187 (119–254)	1.0 (0.7–1.4)

^aAge 18 or older.^bPersons who reported having been diagnosed by a physician with psoriasis. Up to 4% of data missing (question refused or not answered). Therefore, sum of all strata may be less than 601 and less than 4,550,000, respectively.

Consistency between surveys One contract survey organization interviewed 16,050 (59.0%) of the 27,220 respondents and the other the remaining persons. The estimated prevalence of psoriasis was comparable for data derived from both organizations (2.3% (95% CI, 2.0–2.5) and 2.1% (95% CI, 1.8–2.4), respectively). Also, the estimated proportion of persons with psoriasis who were women was comparable for the data from both organizations (60 and 58%, respectively). Data from both survey organizations also estimated comparable proportions of affected persons with substantial psoriasis (three or more palms) (15 and 13%, respectively) and of those who were not satisfied with treatment (46 and 52%, respectively).

Discussion

Prior studies provide limited population-based assessment of psoriasis prevalence, morbidity, and satisfaction with treatment. Our study confirms that psoriasis is common, affecting more than 2% of US adults (Koo, 1996). As a result of the natural history of the disease and therapy, most patients have limited involvement at any time. Nevertheless, psoriasis is not simply a cosmetic problem. Even patients with limited involvement often find their disease a large problem in everyday life. Only 120,000 persons (0.06% of the US population) report more than 10 palms of coverage, but one-half million Americans find this disease to be a large

problem. Nearly 60% of persons reporting their disease to be a large problem and nearly 80% of persons who were very dissatisfied with their treatment had less than 10 palms of coverage.

In contrast to approximately equal prevalence calculated by some other studies, our large population-based study determined that women more frequently reported a physician's diagnosis of psoriasis than some other studies' findings (Farber and Nall, 1974; Koo, 1996; Nevitt and Hutchinson, 1996). This difference in sex was not accounted for by age or extent of disease (data not shown). Possible explanations include recall bias and diagnostic bias, which may reflect women being more likely to seek medical care. For example, women account for nearly 60% of ambulatory visits to dermatologists (Stern and Nelson, 1993).

Strengths and limitations Random-digit dialing is widely used and a well-accepted method for population-based health research including cross-sectional surveys such as ours. Nevertheless, it has several potential biases such as noncoverage of households without telephone and potentially low and often unknown response rates (Brogan *et al*, 2001). To account for differences in the demographic characteristics of respondents and the general US population representation of the survey participants' observations were weighted accordingly to reflect the differences in the distribution of these characteristics among respondents

Table II. Distribution of disease characteristics of survey respondents diagnosed with psoriasis and estimated number of persons and psoriasis prevalence in continental United States with psoriasis by those disease characteristics

Variable	No. of persons with psoriasis from the survey ^a (%)	Estimates (in thousands) of number of persons with psoriasis in US population ^b (95% CI)	Prevalence (%) of psoriasis in US ^b (95% CI)
Total	601	4550 (4150–4951)	2.2 (2.0–2.4)
Current extent of disease			
No or little	333 (59)	2638 (2333–2954)	1.3 (1.2–1.5)
1–2 palms	153 (24)	1146 (951–1341)	0.6 (0.5–0.7)
3–10 palms	73 (11)	506 (380–631)	0.3 (0.2–0.3)
> 10 palms	21 (3)	120 (66–175)	0.01 (0.00–0.02)
General problem in everyday life (1–10 scale)			
1–3 (no or little)	352 (60)	2684 (2429–2939)	1.3 (1.2–1.5)
4–7 (a problem)	163 (28)	1278 (1070–1486)	0.6 (0.5–0.7)
8–10 (a large problem)	73 (12)	489 (374–605)	0.2 (0.1–0.3)
Treatment satisfaction (1–10 scale)			
1–3 (dissatisfied)	140 (25)	1025 (855–1195)	0.5 (0.4–0.6)
4–7 (somewhat satisfied)	153 (27)	1182 (983–1380)	0.6 (0.5–0.7)
8–10 (satisfied)	272 (48)	2055 (1821–2290)	1.0 (0.9–1.1)

^aPersons who reported having been diagnosed by a physician with psoriasis. Up to 4% of data missing (question refused or not answered). Therefore, sum of all strata may be less than 601 and less than 4,550,000, respectively.
^bAge 18 or older.

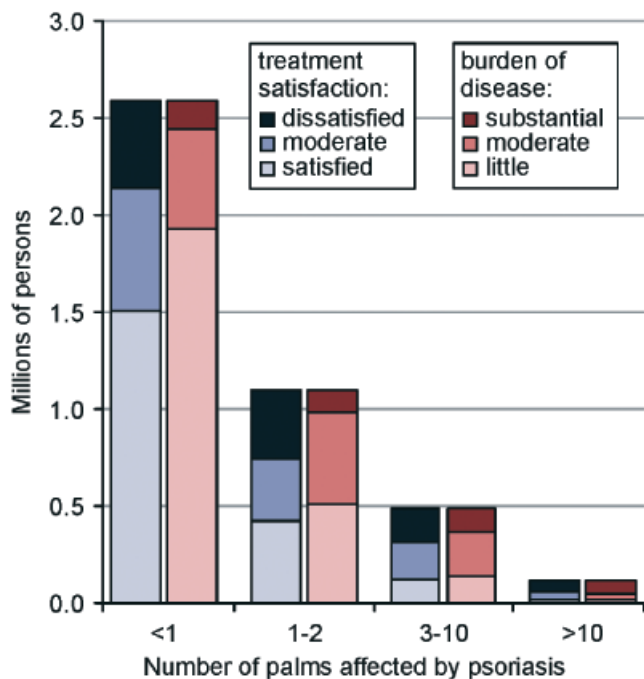


Figure 1 Distribution (and number in millions) of extent of burden and treatment satisfaction among patients with a diagnosis of psoriasis by extent of body surface involved at time of interview.

and the general population (Stata Corporation, 2003). Some studies suggest that this sampling procedure overrepresents persons with higher income and better education

(Olsen *et al*, 1992; Mickey *et al*, 1994). Because persons with a higher socioeconomic status may be more likely to seek medical care for their psoriasis, an ascertainment bias leading to a higher estimate of prevalence is possible. Nevertheless, the distribution of income and education among persons diagnosed with psoriasis and other survey participants are comparable. Therefore, the extent of this bias is likely to be small. The consistency of the results between the two independent survey organizations suggests that sampling bias is small or absent and that combining the data collected by the two organizations is appropriate. Because the survey was introduced as a “general health survey” and the first questions did not ask about psoriasis, substantial response bias is unlikely. Recall bias may have affected our results.

There are a number of other limitations of this study. The validity of self-reported psoriasis has not been studied, but in other common chronic diseases it appears to be reasonably accurate (Martin *et al*, 2000). When compared to physician evaluation, a self-administered psoriasis severity questionnaire showed good agreement between physicians and patients but a different measure of involvement, which included extent as one element, was used (Feldman *et al*, 1996). Not surprisingly, using our self-reported extent of disease, our population-based sample indicates a smaller proportion of patients with extensive psoriasis than reported previously in clinic-based studies (Fleischer *et al*, 1996). Our questions on treatment satisfaction and disease burden, or problem of the disease in everyday life, are necessarily subjective. Individual patients’

extent of disease will vary over time and perhaps seasonally, but our estimate of the distribution of extent in the population is likely to be robust for the fall season when interviews were done.

Implications Our survey documents that psoriasis is not only common but also has a substantial negative impact on everyday life for a large number of persons. In addition to new therapies for patients with moderate to severe psoriasis, innovations in psoriasis therapy are needed for the nearly 1 million US residents with less extensive but often troubling disease (Finlay and Coles, 1995; Krueger *et al*, 2001).

Materials and Methods

Survey procedures In late 2001, the National Psoriasis Foundation commissioned two contract survey organizations to contact a general population sample of persons age 18 or older representative of residents of the contiguous 48 United States. Both organizations surveyed independently. They used the same sampling procedure and questionnaire. Households to be contacted were selected by random digit dialing and were called up to three times before being replaced by a next randomly selected telephone number in the contiguous 48 United States. Each response was weighted according to standard methods (Stata Corporation, 2003). One survey organization developed weights based on the distribution of respondents compared to that of the US population stratified by sex, age, ethnicity, and region and the other used the same methods and stratification variables, except they excluded region. In our primary analysis, data collected by both organizations were analyzed together. To assess consistency between the two survey organizations, we compared estimates of selected endpoints based on the two survey groups' data.

Study variables We asked all participants questions concerning sociodemographic characteristics and whether they had ever been diagnosed by a physician as having psoriasis. We asked patients who indicated a diagnosis of psoriasis to estimate extent of involvement, the extent to which psoriasis had been a problem in everyday life, satisfaction with treatment, and the specialties of physicians seen for this condition. Respondents were asked to estimate the extent of their psoriasis in one of four categories "little or none" or according to number of palms to cover their psoriasis (1–2, 3–10, or >10 palms). Using 10-point Likert scale (1 = not, 10 = very great), we asked patients to assess both how much of a problem their psoriasis was in everyday life and their satisfaction with treatment. We classified the responses in the 3 (of 10) highest ratings as a large problem or dissatisfied with treatment, the 4 middle responses (4–7) as a problem or somewhat satisfied with treatment and the 3 lowest ratings as no or little problem or satisfied with treatment. We received a waiver not requiring written consent from the Western IRB. Participation was voluntary and the study fully conformed to the guidelines of the Declaration of Helsinki.

Statistical methods The sampling design of the study yielded sampling weights (probability weights) for each observation, which permit calculation of point estimates. We used Stata (Version 7, Stata Corporation, College Station, TX) procedures for survey data to estimate the number of persons and 95% confidence intervals (95% CI) age 18 or older with psoriasis in the United States in 2001

as well as demographic and disease characteristics of those affected. We used logistic regression models for survey data to determine patients' attributes associated with higher odds (and 95% CI) of reporting psoriasis as a large problem and/or being dissatisfied with psoriasis treatment. The multivariate estimates were adjusted for all other variables significantly associated with that endpoint in the univariate analyses.

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